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The Hudson Oil Cushioned Clutch*

THE OFFICIAL FACTORY STORY ON ITS DESIGN, OPERATION, SERVICE PROCEDURE AND LURICATION

By T. H. STAMBAUGH, Director of National Service Operations,
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General Design

The clutch is of the single plate type, operating in a bath of oil. The frictional surfaces are of formed cork while the plate drive to the hub is through springs. The combination of the pliable cork in oil and the spring hub mounting gives maximum smoothness of engagement and freedom from periodic vibration.

The rear face of the steel flywheel and the front face of the drop forged steel pressure plate bear against the faces of the driving plate frictional surfaces. The pressure plate is held by springs equally located around the circumference and the pressure plate is drawn back from the driving plate by three levers which are mounted on the clutch cover and moved by the ball thrust bearing.

Clutch Linkage

The throwout bearing is operated by a yoke which is connected to the clutch pedal through linkage, part of which is carried in the clutch bell housing and the remainder on the frame. The connection between these two parts of the linkage is designed to permit the engine to float on its mounting without interfering with the clutch operation.

This connection consists of a double end lever on the pedal shaft which bears against rubber pads on the clutch yoke shaft lever which are replaceable. The springs on the pedal and linkage hold these parts together to prevent rattles.

Pedal Adjustment

The length of the rod which connects the clutch pedal to the cross shaft lever should be adjusted so that the center of the clutch pedal clamp bolt is 1½ inches from the toe board, as shown. Less clearance than this may cause the pedal to "ride" the toe board and cause the clutch to slip. More clearance reduces the pressure plate movement with the possibility of preventing complete clutch disengagement and also reduces the load exerted on the linkage by the pedal spring so that rattles may develop.

To adjust: Loosen lock nut shown in illustration, remove clevis pin and turn yoke to shorten or lengthen the rod as necessary.

Lubrication Service

The lubricant in the clutch, in addition to lubricating the working parts, also cools the friction surfaces and keeps the pores of the corks clean, so that the cushioning effect is maintained throughout the life of the clutch.

The cushioning effect during engagement is obtained by having the corks saturated with oil. As the pressure plate and flywheel come in contact with the cork the oil is wiped off the surface and engagement begins. As the pressure is increased by further release of the clutch pedal the oil is squeezed out of the corks, providing a film on the frictional surfaces, so that engagement is very gradual; with the surfaces wiped dry the engagement is complete.

Hudsonite Clutch Compound has been developed by the Hudson factory to take care of this requirement after exhaustive laboratory work and road testing and is recommended by the factory to insure protection to the parts and also to maintain the original condition of the corks. If clutch engagement is not smooth or disengagement is not complete, after the correct amount of Hudsonite has been inserted in a clutch, it is very probable that an improper fluid has been previously used and the corks have become glazed and the pores closed.

If this condition is encountered the clutch should be flushed with kerosene and relubricated with Hudsonite, which will, after a few hundred miles of driving, clean the corks and give normal clutch action.

The fluid in the clutch should be drained and replaced every 5,000 to 15,000 miles. To drain, turn the engine until one of the plugs in the front of the flywheel is in the timing inspection opening at the left side of the rear engine support plate as shown. Remove the plug (A) with socket wrench.

Turn the engine slowly, approximately one-third revolution, until the star on the flywheel is in line with the pointer on the timing inspection hole. This brings the drain hole to the bottom and permits all the fluid to drain out.

Turn the engine until the drain hole is in the timing opening and insert exactly ⅓ pt. of Hudsonite Clutch Compound.

Clutch Overhaul

After the transmission is removed from the car the 16 capscrews around the clutch cover are removed and the clutch assembly removed from the car and taken to the bench. The entire assembly should be washed thoroughly.

Inspection (Before Disassembly)

(1) Inspect the driving plate to see that the corks are in good condition. A black glaze indicates the use of an improper lubricant. Hudsonite keeps the pores of the corks open and, if

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7th Annual Convention

NATIONAL LUBRICATING GREASE INSTITUTE

WHEN . . . . October 2 - 3, 1939

WHERE . . . Stevens Hotel, Chicago, Ill.

Arrangements have been completed to hold the 7th Annual Convention of the National Lubricating Grease Institute, at the Stevens Hotel, Chicago, Ill., October 2nd and 3rd.

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Although previous conventions of the "Institute" have left nothing to be desired from the type of program presented and the record of attendance, the 7th will outshine them all.

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The Convention committee headed by F. C. Kerns, has arranged a very fine program of subjects on information pertinent to the grease industry as a whole. There will be technical papers on raw materials, grease manufacture, merchandising, application and its use, both automotive and industrial, equipment and its use, both automotive and industrial, along with the views of the user or consumer of the various products we manufacture. Speakers are all men of national prominence and "tops" in their respective fields.

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In conjunction with this very fine program there will be an exhibition by Associate Members of the Institute. Here is an opportunity to see what is new in the line of products of every day interest to the Grease Industry.

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Last but not least—the Annual Banquet will be held Monday evening, October 2nd. A fine menu is assured and entertainment par excellence.

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Watch your trade journals for further announcements. A complete program will be released in the SEPTEMBER issue of the SPOKESMAN.

The INSTITUTE SPOKESMAN

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the corks are not burned, soaking in Hudsonite and the use of Hudsonite in the clutch after reassembly will clean up the cork surfaces. Clean cork surfaces are necessary for smooth engagement and "clean" disengagement.

The driving plate should run true and the springs and spring cages should retain the hub in the disc without appreciable rotary or sidewise lost motion.

The hub splines should be free of burrs to permit free movement on the spline shaft.

(2) The pressure plate should be free of scores or blued spots. Blued spots indicate that the clutch has been operated at an excessive temperature, and the engaging springs should be replaced as they have undoubtedly lost their tension.

If blued spots are found, there is also a possibility of the pressure plate being warped. It is necessary to remove the pressure plate from the clutch assembly in order to test for warpage.

Do not confuse gummed oil spots with blued spots. The gummed oil may have a similar appearance but is readily scraped off.

Disassembling the Clutch Assembly

Before disassembling, look for the punch marks near the outer edge of the pressure plate and a corresponding mark near it on the turn of the cover flange. These marks indicate the position of the parts when the assembly was balanced at the factory and the unit should be reassembled with the marks together to maintain the original balance.

If the marks are not readily visible, make them so with a prick punch.

Place the clutch assembly in the clutch fixture and remove the three nuts from the back of the cover. The cover can then be removed, exposing the springs, clutch fingers and finger retainers.

Testing Pressure Plate for Warpage

If a surface plate is not available for testing the pressure plate, lay it face to face with a new plate and test by inserting a feeler gage between the plates.

If a .010 in. feeler gage can be inserted at any point between the plates there is sufficient warpage to warrant replacement of the plate.

Engaging Springs

The engaging springs used in Hudson clutches are pre-set so that they will lose very little of their original strength in use, unless they become excessively hot. However, it is good practice to replace the engaging springs after long usage.

Always use genuine Hudson clutch springs. They are pre-set, tested for strength, squareness of ends and deflect true to the center line. All these qualities are essential for satisfactory clutch operation.

Throwout Fingers

The throwout fingers should be straight and not show appreciable wear at the points where they rest against the retainer or throwout bearing.

The retainer washers should be replaced with new ones if not in good condition.

Reassembling

Place the pressure plate on the fixture with the friction face down. Put springs, throwout fingers, finger retainers and retainer washers in place.

Put cover in place, being sure punch mark lines up with mark on pressure plate for correct balance.

Put hand wheel in place and guide throwout finger retainers into holes in cover as wheel is being run down on screw. Put nuts on three throwout finger retainers, drawing down securely. Remove hand wheel and remove clutch assembly from fixture.

Flywheel and Pilot Bearing

The flywheel face should be smooth and the hold-on nuts should be drawn tight.

If the pilot bearing in the flywheel does not run smoothly, or is not free, it should be replaced.

Reinstalling Clutch Assembly

Shellac a new gasket to the front face of the clutch cover bolting flange. Pass the Clutch Aligning Arbor through the hubs of the clutch cover and drive plate and enter it into the pilot bearing. Push the clutch assembly into place against the flywheel and then secure with capscrews with the aligning arbor still in place to keep the drive plate centered to permit easy installation of the transmission.

The capscrews should be tightened gradually, drawing down diametrically opposite screws, in order to insure a good gasket seal.

Aligning Clutch Fingers

The three clutch fingers must be in alignment to insure all contacting the throwout bearing. Improper alignment causes clutch finger rattle at idle speeds and uneven movement of the pressure plate which causes grabbing and chattering of the clutch.

To align the fingers place bar of the Clutch Finger Adjusting Gage against the rear of the clutch cover hub so that the pin is resting on one of the fingers. Turn down the thumbscrew until it contacts the pin. Move to the other two fingers, turning the thumbscrew down if necessary, to take up clearance with the gage pin. The final adjustment of the gage will give the level of the lowest finger.

Swing the gage around to one of the high fingers and strike the end of the finger retainer with a soft hammer until the gage bar rests squarely on the cover hub.

Swing the gage to the other high finger and repeat the operation. Swing back to the low finger to check. The gage should now rest squarely on the hub over all fingers, but with less than .005 in. clearance between the thumbscrew and pin of the gage. Check this clearance at each finger with a feeler gage.

Lubrication

Insert ⅓ pt. of Hudsonite in the clutch housing through the hub of the cover.

Throwout Bearing and Oil Seal

The throwout bearing should be clean and run smoothly. The oil seal should be in good condition without any tears or folds in the leather.

The clutch throwout bearing and the oil seal are both pressed onto the throwout collar. It is very important that in pressing these parts into place care be exercised so that they will not be damaged.

The oil seal should be pressed on with a steady pressure exerted near to the inner diameter. If the pressure is exerted on the outer stamping, it will be distorted and pushed into the leather seal so that there is a possibility of it becoming loose in the inner stamping. When this happens the leather seal will spin with the clutch cover and carry the outer stamping with it. This naturally will cause a rubbing sound between the two stampings of the seal.

This noise can readily be mistaken for a noisy throwout bearing, so that in any cases where the throwout collar is disassembled from the clutch, the oil seal outer stamping should be checked to see that it is held tight in the inner stamping. This can be checked by turning the outer seal with finger pressure.

The throwout bearing should be put in place by pressing with a continuous pressure as the force must be exerted through the ball races and balls. If the bearing is

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driven in place the ball races may be marked by the balls, causing the bearings to become noisy.

The arbor of the press used should be square and large enough in diameter to cover the entire surface of the bearing on which the clutch fingers normally rest. While pressing the bearing in place, it should be turned so that the balls move in the races to be sure that load is uniformly divided. When installing a bearing, and every thousand miles thereafter, it should be lubricated with a good quality of viscous grease (Chassis Lubricant) through the pressure fitting in the right side of the clutch bell housing.

EDITOR'S NOTE: Correct lubrication service on the Hudson Clutch is extremely important. If neglected or improperly serviced, complaints from car owners are likely to result. A situation of this kind adversely affects the prestige of the Hudson car and the reputation of the service station, and will result in loss of customers.

In this story, Mr. Stambaugh gives official Hudson instruction for servicing the Hudson oil cushioned or wet type clutch — just as they want their own dealers to handle this service.

*What Car Makers Say**

LATEST FACTORY RECOMMENDATIONS

CADILLAC All Models — The manufacturer has extended the mileage interval for lubrication of front wheel bearings on all models for all years. It is now recommended that front wheel bearings be lubricated every 12,000 miles, instead of every 6,000 miles as previously specified.

CHRYSLER 1939 MODELS — The manufacturer now recommends that the transmission on 1939 models be drained and refilled every 15,000 miles.

CROSLEY 390 - 1939—On the first few cars built by Crosley the tie rod ends were rubber mounted. However, a change has been made and in production a Thompson type tie rod is being used, requiring lubrication through a fitting at each end with Chassis Lubricant every 1,000 miles.

Effective June 8, Crosley has changed the model designation in production to Model A. Cars manufactured under the designation 390, as a means of body identification, will be going out of the factory for several months.

DE SOTO 6 (S6) - 1939 — The manufacturer now recommends that the transmission be drained and refilled every 15,000 miles.

DODGE 6 (D11) - 1939 — The manufacturer now recommends that the transmission be drained and refilled at 15,000 mile intervals.

FORD AND LINCOLN ZEPHYR—The manufacturer has changed the specifications for Ford Special Spring Lubricant, used on Ford and Lincoln Zephyr springs lubricated through a fitting on the spring tie bolt.

The principal change in the specifications is an increase in the body of the lubricant.

FORD V-8 DELUXE - 1939 — The manufacturer has changed the recommended cooling system capacity from 22 qt. to 21 qt.

GRAHAM All Models — The manufacturer has changed the mileage interval for steering gear lubrication from 2,000 to 6,000 miles. The interval for lubricating rear wheel bearings equipped with fittings or grease cups has been changed from 1,000 to 6,000 miles.

HUPMOBILE Hupp Skylark (R) - 1939 — When this model was first announced, the manufacturer made the recommendation of Engine Oil for the transmission with the thought in mind that transmission overdrive would be made optional equipment later on. It has since been decided, however, that this will not be done, and the manufacturer has changed the transmission lubricant recommendation to Fluid Gear Lubricant SAE 90 above ÷32° and SAE 80 below ÷32°. Hupp feels that this recommendation is more practical, as SAE 70 and SAE 50 grades of Engine Oil are not always available.

A change has been made in the size and shape of the crankcase pan to provide greater clearance, reducing the capacity. The recommended crankcase capacity is now 5 qt. instead of 6 qt.

MERCURY 8 - 1939 — The manufacturer has changed the recommended cooling system capacity from 22 qt. to 21 qt.

NASH 6, 8, LA FAYETTE - 1938 — The Nash factory informs us that hypoid gears were used on some 1938 cars as well as on part of 1939 production. This situation with regard to 1939 production was covered in the May issue of THE INSTITUTE SPOKESMAN. Nash has now changed the differential lubricant recommendation from Extreme Pressure Gear Lubricant to Hypoid Gear Lubricant for both hypoid and spiral bevel rear axles on 1939 models.

Hypoid rear axles on both 1938 and 1939 models have a bolted-on cover with drain plug. Spiral bevel rear axles are of two types. One type has a bolted-on cover but no drain plug; the cover must be removed to drain. The other type has a separate carrier with welded-on cover and a drain plug.

PLYMOUTH P7, P8 - 1939 — The manufacturer has changed the recommended mileage interval for draining and refilling the transmission to 15,000 miles.

PONTIAC All Models — The manufacturer now recommends Mild Extreme Pressure Gear Lubricant SAE 90 all seasons for transmission lubrication. If SAE 90EP is not available, Fluid Gear Lubricant SAE 140 above ÷60°, SAE 90 below ÷60° may be used.

Mild Extreme Pressure Gear Lubricant SAE 90 all seasons is also recommended for all spiral bevel differentials; however, the manufacturer states that Hypoid Gear Lubricant SAE 90 may be used in spiral bevel differentials if desired.

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SEVENTH ANNUAL CONVENTION

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